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may get along with less of it. "These things ought ye to have done and not to leave the other undone."

Huxley is not responsible for the fact that our courses in biology have been narrow and narrowing. To show his broad view of the subject let me, in closing, quote him:

To a person uninstructed in natural history a stroll in the country or by the seaside is like a walk through a gallery filled with wonderful works of art nine-tenths of which have their faces turned toward the wall. Teach him something of natural history, and you put into his hand a catalogue of those worth turning around. Surely our innocent pleasures are not so abundant in this life that we can afford to throw away this, or any other, source of them.

Following is an abstract of the paper of Professor Wilbur S. Jackman, of the University of Chicago, upon the subject:

WHAT SHOULD BE EMPHASIZED IN TEACHING BIOLOGY?

Within the lifetime of biology teachers now living the methods of teaching the subject have completely changed. It has not been many years since books like Orton's text-book in zoölogy, used mainly as a reader, furnished the basis for most of the work done even in some colleges. Just as the sciences of chemistry and astronomy were revolutionized, respectively, by the discoveries of Lavoisier and Copernicus, so the work of Darwin began a new era in the teaching of biology. The text-book as a reader was discarded, to be succeeded by the laboratory manual and the scientific treatise. These books were valuable in detailing the minutiae of method and in showing the form which the results of observation should take. Neither book concerned itself with either the purpose of the study or the breadth of outlook, and the slavish use of the manual has made biology, to speak by paradox, a lifeless study.

Progress in the study of plants and animals in their wider relationships has been retarded by the ancient custom of giving to the studies of botany and zoölogy a tandem presentation; that is, one preceding the other. It is now pretty clearly recognized that any science, so-called, may serve to introduce the student to nature, and that no one study can do more than offer an introduction. The subject of ecology now undertakes to work out the social relations of living things under normal conditions. The application of its principles may be made by the mature student or by the beginner.

Questions relating to material and method in biology are now treated with intelligence and skill, but the question of motive has scarcely been touched. The position of natural science in the lower schools is still tentative, because its mission in the minds of most teachers is still problematical. In answering

the question, "What can science do to make a pupil more upright and more moral generally?" the science teachers have not been as clear and direct in their reply as the teachers of the humanities, so-called, have been in answering the same question when asked concerning their subjects. The latter are always ready to show how the dealings between men become the basis of moral instruction; but the science teacher finds it difficult to point to the same result in his lessons on the crayfish or grasshopper.

In the pre-Darwinian period, plants and animals were studied largely from the side of their usefulness to man. Darwin's story attracted the common mind by the portrayal of many "novelties" in living forms that had not been observed before. The use in sense-training, accuracy, the economic value, and the effect of the study of nature as the embodiment of pure truth, all have been urged, and rightly, as true reasons for the study of science. But most of these reasons apply equally well to everything else that is studied. To most people they, at best, but indirectly answer the question as to the effect of science-teaching upon the development of moral character.

It would seem that until some common ground can be reached upon which the two great divisions of human learning, science and the humanities, may rest, we shall always find the parts of our curriculum at cross-purposes. In times past, both of these two branches of knowledge were used to support dogmas that were often summed up in the form of a creed. With the advent of Darwinism, men of science broke loose from creed bondage and began to look for the facts regardless of their significance. In thus divesting themselves of every ulterior purpose in the study of nature, it is not strange that people should get the impression that the facts of science have no significance in the lives of men. In the past the anxiety to identify the facts of nature with selfish human interests led to inaccuracy, not to say dishonesty, in observation. As a reaction, many teachers leave the impression that the facts have no significance; hence science becomes a vague or purposeless study for their pupils.

Without desiring to reimpose upon science the task of supporting dogmas in either morals or religion, one may properly consider the advisability of laying more stress upon the significance of the facts of nature in terms of human life. Is not this significance a part of the fact itself? If so, then their pupils should be guided in the search for it.

The humanities have had but little success in teaching lessons of morality, if we may judge by the present political and social status of the race and of individuals, because of their utterly unscientific methods of treatment of the question. In the past the race has been pretty well satisfied if it could only develop the *forms* of morality through either fear of punishment or hope of reward, or through imitation. Science, however, must go deeper than form. It regards the moral relations as expressing the highest and the most delicate concessions and adaptations that are known to intelligence. The lesson of concession and adaptation is taught by both the roadside weed and the glorified

soul that at once sacrifices and saves itself for the weak and unfortunate. To recognize this lesson in either or in both means moral development, and life—physical, mental, and moral. Failure to recognize it means death—annihilation. This is the ground of the new morality upon which the humanities themselves must stand; supported by modern science as well as by the humanities, this ground will furnish the soil from which the ethical code of the twentieth century will grow.